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NOTES ON ASCLEPIADACEAE, 1

P.I. Forster

Botany Department, University of Queensland, St Lucia, Qld 4067

Summary

Cynanchum liebiana (F. Muell.) P. Forster comb. nov. and _C. christineae_ P. Forster sp. nov. are described. _Sarcostemma esculentum_ (L.f.) Holm is newly recorded for Australia with _Marsdenia brockmaniana_ W. Fitzg. placed in synonymy. The status of _Tylophora erecta_ F. Muell. ex Benth., _T. macrophylla_ Benth. and _T. stelligera_ Schltr. is reviewed with _T. macrophylla_ and _T. stelligera_ being relegated to synonymy. _Tylophora benthamii_ Tsiang is shown to be the earliest available name for the taxon known variously as _T. floribunda_ Benth. or _T. crebriflora_ S.T. Blake. Isotype material of _Sarcolobus ciliolatus_ Warb. and _S. obovatus_ Rintz at the Queensland Herbarium is documented and _S. obovatus_ recorded for the Solomon Islands and northern Papua New Guinea. A generic account for _Finlaysonia_ Wallich in Australia and New Guinea is given, with _F. obovata_ Wallich being recorded for the region. _Gymnema sylvestre_ (Retz.) R. Br. ex Schultes is lectotypified. The species does not occur in Australia. _Gymnema pleiadenium_ F. Muell. is an earlier name for the taxon known as _Gymnema dunnii_ (Maiden & Betche) P. Forster. _G. pleiadenium_ is distinguished from _G. geminatum_ R. Br. and _G. sylvestre_. _Brachystelma glabriflorum_ (F. Muell.) Schltr. is the earliest name for the species of _Brachystelma_ that occurs in Australia and New Guinea.

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There are relatively few collections of certain Australian and New Guinean Asclepiadaceae available for taxonomic study. Furthermore, many specimens in herbaria are of limited use in the preparation of accurate descriptions, due to the poor quality of the specimens compounded by the distortion to the intricate floral structures brought about by pressing and drying. Consequently comprehensive treatments of the larger genera such as *Marsdenia* R. Br., *Cynanchum* L., *Gymnema* R. Br. and *Tylophora* R. Br. cannot be completed until a number of satisfactory specimens in spirit (obtained from both field collections and cultivated material) can be examined.

However, due to some recent excellent collections of material, several new taxa have been recognised. Some of these are known only from a few specimens or apparently have a restricted geographical range and they are described here to draw attention to their conservation status.

In addition to the descriptions of new species, notes on nomenclature are provided for a number of taxa, and some new records for Australia are discussed.

Materials and Methods

Holdings at BRI, BRIU, CBG, DNA, JCT, MEL, PERTH, QRS, partial holdings at CANB and selected types at K and LD were examined. In specimens cited below, material preserved in spirit is indicated by an *. Material at NSW was unavailable for loan due to staff shortages (K. Hill, pers. comm. 1988). Collections were made or obtained in Queensland and the Northern Territory, with material in spirit (70% alcohol, plus glycerol) used in most instances for preparing descriptions.

The small structures at the base of the lamina in many taxa of the Asclepiadaceae and related Apocynaceae have been variously referred to as 'finger glands' or 'glands' in Australian literature (Williams 1984; Stanley & Ross 1986). These are correctly termed extrafloral nectaries (Arekal & Ramakrishna 1980; Mohan & Inamdar 1986) and should not be confused with the floral nectaries present in most species in the family (Christ & Schnepf 1988).

CYNANCHUM L.

Examination of the type specimen of *Tylophora liebiana* F. Muell. revealed that the species should be placed in *Cynanchum* and that it is allied to *C. brachystelmoides* P. Forster and *C. christineae* P. Forster. Von Mueller's (1891) placement of this taxon in *Tylophora* is not altogether surprising, as it possesses a staminal corona which is superficially similar to that of several taxa of *Tylophora* in that the lobes are rounded and do not overtop the staminal column. In this respect, the taxon is similar to *Cynanchum hydrophilum* Tsiang & Zhang, *C. riparium* Tsiang & Zhang and *C. gracilipes* Tsiang & Zhang from China (Tsiang & Li 1976). The form of the pollinia (not globose as in *Tylophora*), corolla and bud shape, and the position of the staminal corona all clearly indicate that *T. liebiana* is a species of *Cynanchum*.

Cynanchum liebiana (F. Muell.) P. Forster, **comb. nov.**

Tylophora liebiana F. Muell., J. & Proc. Roy. Soc. New South Wales 24: 78 (1891). **Type**: Port Darwin, 1890, *M. Holtze* 1010 (holo: MEL).

Herbaceous perennial. Roots thinly fibrous-fusiform, to 60 mm long, 2–3 mm diameter. Stems cylindrical, upright, to 60 cm long, 0.4–0.5 cm diameter, up to 30 nodes on flowering plants, glabrous; internode length variable to 7 cm. Leaves narrow-linear, glabrous, 40–50 mm long, c. 1 mm wide. Flowers borne on top 2 or 3 nodes. Cymes umbelliform, appearing at nodes between the pair of leaves, 1–5-flowered; peduncles glabrous, 5–8 mm long, c. 1 mm diameter. Flower pedicels 11–12 mm long, c. 0.5 mm diameter, filiform, pendulous during anthesis, glabrous. Calyx without basal glands; sepals broadly triangular, acute, glabrous, c. 2.5 mm long, c. 1 mm wide. Petals 5, distinct, twisted in bud; linear-lanceolate, 10–11 mm long, c. 1.5 mm wide, abaxial surface glabrous, purple-brown or cream, adaxial surface glabrous or with white cilia, purple-brown or cream. Corona of 5 separate lobes adnate to base of staminal column, c. 3.75 mm diameter; lobes broadly ovate to globose, tip rounded, c. 0.5 mm long, c. 1 mm wide, purple-brown or cream. Staminal column c. 1.5 mm long, c. 1.25 mm diameter, corona adnate to bottom two-thirds. Anther connectives incurved, apical appendage ovate, c. 0.5 mm long, c. 0.5 mm wide. Slit between anther wings c. 0.75 mm long. Pollinaria 0.52 mm long, 0.36 mm wide; pollinia solitary in each anther cell, pendulous, oblong-ovoid, 0.28 mm long, 0.13 mm wide; caudicles curved, translucent, 0.1 mm long, 0.04 mm wide; corpusculum oblong, brown, 0.2 mm long, 0.13 mm wide. Style-head conical, obtuse, cream. Follicles fusiform-globose, glabrous, c. 6 cm long, c. 1 cm diameter; fruiting pedicel 15–16 mm long, c. 1 mm diameter. Seed 15 mm long, 10 mm wide, ovoid, light-brown; coma absent. **Fig. 1.**

Specimens examined: Northern Territory. DARWIN AND GULF DISTRICT: 15 km S of Darwin, Swamp W of Rural Caravan Park, 12°55′S, 130°58′E, Dec 1984, *Jones* 1738 (DNA); Cnr Bonson Terrace & Elrundie Avenue, Palmerston, Dec 1987, *Tingey* [AQ408479] (BRI*); ditto, Feb 1988, *Tingey* [AQ408482] (BRI); Elrundie Avenue, Palmerston, 12°30′S, 131°00′E, Feb 1987, *Tingey* s.n. (DNA*).

Distribution and habitat: The species has been recorded only from the area surrounding Darwin, from sandy embankments on disturbed ground adjacent to black soil paperbark swamp. This is the ARNM Region of Barlow (1985).

Phenology: Flowering occurs from November to December with the flowers opening in the morning and closing by midday (R. Tingey, pers. comm. 1987). Fruiting occurs from February to March.

Notes: **Table 1** provides a comparison of the major differences between *C. liebiana*, *C. brachystelmoides* and *C. christineae*.

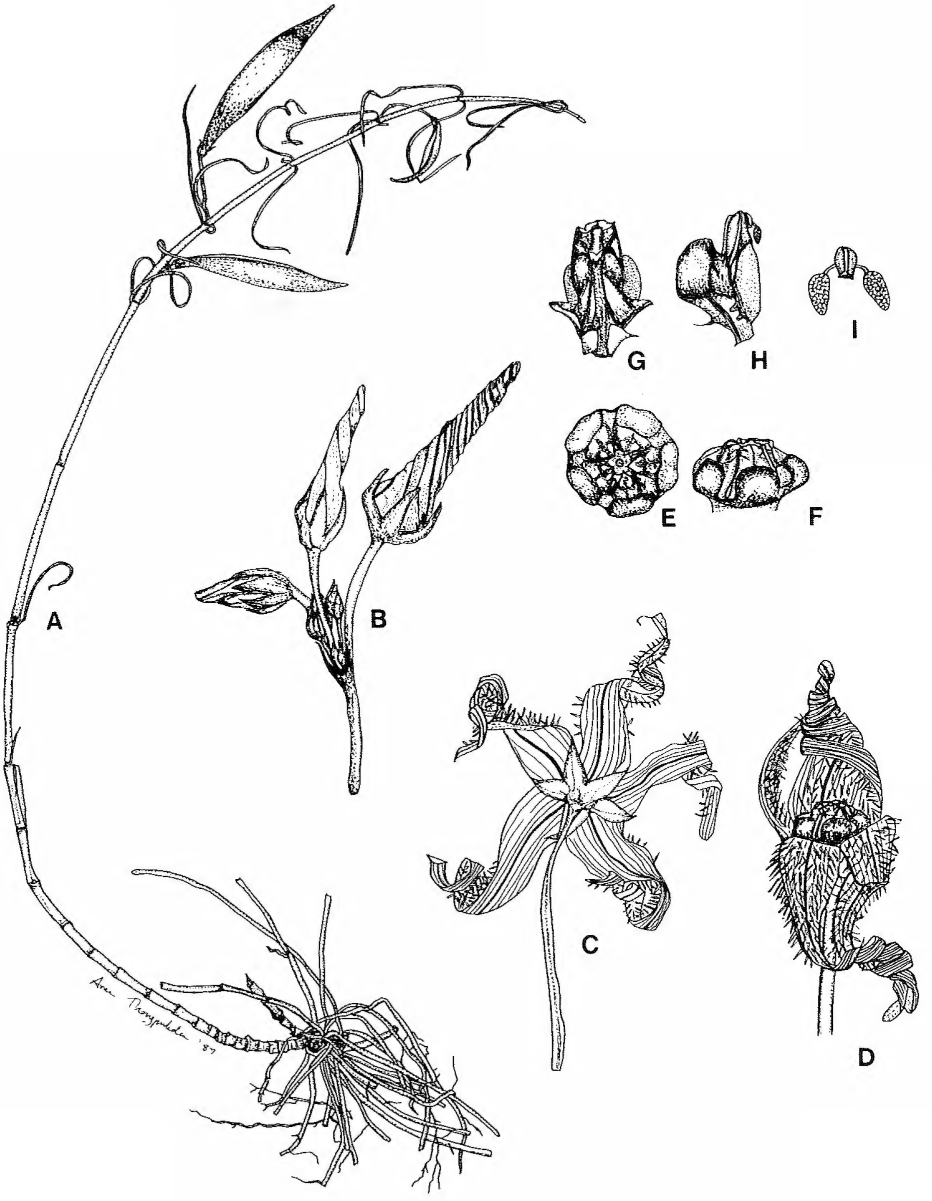

Fig. 1. *Cynanchum liebiana*: A. habit × 0.5. B. cyme with several buds × 3. C. ventral view of flower × 3. D. lateral view of flower with petals partly unfurled × 3. E. apical view of staminal corona and column × 5. F. lateral view of staminal corona and column × 5. G. front view of anther × 20. H. lateral view of anther and associated coronal lobe × 20. I. pollinarium × 40. All from spirit material of Tingey s.n. (DNA). Del. A. Thongpukdee.

Table 1. Comparison of major distinguishing characters of *Cynanchum liebiana, C. christineae* and *C. brachystelmoides* (*C. brachystelmoides* data from Forster & Thongpukdee 1988).

Character	*C. liebiana*	*C. brachystelmoides*	*C. christineae*
Sepal size (length × width)	c. 2.5 × 1 mm	1–1.25 × 0.1–0.2 mm	c. 1.5 × 1.0 mm
Petal shape	linear-lanceolate	ovate-oblong	linear-lanceolate
Petal size (length × width)	10–11 × c. 1.5 mm	1.5–1.7 × c. 0.4 mm	c. 5.0 × 1.5 mm
Corona lobe shape	broadly ovate-globose, tip rounded	broadly-ovate, tip ovate-obtuse	cylindrical-oblong, tip rounded
Pollinium size (length × width)	c. 0.28 × 0.13 mm	c. 0.1 × 0.025 mm	c. 0.21 × 0.13 mm
Corpusculum length	c. 0.2 mm	c. 0.1 mm	c. 0.2 mm
Caudicle length	c. 0.1 mm	c. 0.015 mm	c. 0.14 mm

The lack of a coma on the seed of *C. liebiana* and *C. christineae* is an unusual feature as a coma is normally present on seeds of Asclepiadaceae. Rintz (1980) records *Sarcolobus carinatus* Wall., *S. globosus* Wall. and *S. oblongus* Rintz as having seed without a coma. Unfortunately the follicles and seed of *C. brachystelmoides* are still unknown. *C. liebiana* is a particularly beautiful plant and efforts should be made to propagate material for cultivation.

Conservation status: At present this species is only definitely known from the area of the cited collections. These are from areas of disturbed ground or near to human habitation and are under immediate threat from housing development. An appropriate conservation coding is 1E (Leigh *et al.* 1981).

Cynanchum christineae P. Forster **species nova** affinis *C. brachystelmoidi* P. Forster sed sepalis ca 2.5 mm longis et 1 mm latis, petalis linearibus-lanceolatis, lobis coronae cylindricis-obloideis, polliniis ca 0.21 mm longis et 0.13 mm latis; corpusculis ca 0.2 mm longis et caudiculis ca 0.14 mm longis differt. **Typus**: Palmerston, 12°29′S, 130°58′E, December 1987, *C. Cox* [AQ408484] (holo: BRI).

Herbaceous perennial. Roots thinly fibrous-fusiform, to 80 mm long and 1 mm wide. Stems cylindrical, upright, to 30 mm high, 1–2 mm diameter, up to 19 nodes on flowering plants, finely pubescent with uniseriate hairs; internode length variable to 25 mm. Leaves linear-lanceolate, to 80 mm long, 1–8 mm wide, main rib single, secondary veins 3 or 4, sparsely pubescent with uniseriate hairs. Flowers borne on top 2–10 nodes. Inflorescence an umbelliform cyme appearing at nodes between the pairs of leaves, 1–6-flowered; peduncles finely pubescent, 2–11 mm long, c. 0.5 mm diameter. Flower pedicels 3–7 mm long, c. 0.5 mm diameter, finely pubescent with uniseriate hairs, filiform, pendulous during anthesis. Calyx without basal glands; sepals linear-lanceolate, c. 1.5 mm long, c. 1.0 mm wide, generally glabrous but with a few sparse cilia on the edges. Corolla deeply 5-parted, c. 5 mm long, 4 mm diameter; petals twisted in bud, linear-lanceolate, generally glabrous but with a few sparse cilia on the top edges, c. 5 mm long, 1.5 mm wide, cream. Corona a continuous ring around the base of the staminal column, double lobed, c. 2 mm long, 2.5 mm diameter, cream; main (inner) lobe obloid-cylindrical with tip rounded, curving inwards over the stamens, c. 1 mm long and 0.5 mm diameter; secondary (outer) lobe a small protuberance at base of the main lobe. Staminal column c. 2 mm long, 1.5 mm diameter with corona adnate to bottom third. Anther connectives incurved; apical appendages acute, c. 1 mm long, 1 mm wide; slit between anther wings 0.5 mm long. Pollinarium 0.44 mm long, 0.6 mm wide; pollinia pendulous, oblong, golden, 0.21 mm long, 0.13 mm wide; corpusculum 0.20 mm long, 0.11 mm wide, oblong, tan; caudicles 0.14 mm long, 0.05 mm wide. Style-head conical, cream, c. 1 mm wide and extending c. 1 mm above the anthers. Follicles fusiform, glabrous, c. 4.5 cm long and c. 5 mm diameter. Seed 9 mm long, 3 mm wide, ovate, tan; coma absent. **Fig. 2.**

Specimens examined: Northern Territory. DARWIN AND GULF DISTRICT: Leander Swamp Bombing Range, Jan 1969, *Byrnes* NB1284 (DNA); Palmerston, Dec 1987, *Tingey* [AQ408486] (BRI*); ditto, Sep 1988, *Tingey* (BRI).

Distribution and habitat: This species occurs in the ARNM Region of Barlow (1985) and is recorded from cleared black soil/sandy loam in association with *Xanthostemon paradoxus*, *Terminalia* sp., *Eucalyptus miniata*, *Pleurocarpaea denticulata*, *Hypoxis marginata* and *Brunoniella* sp.

Phenology: Flowering occurs from December to January.

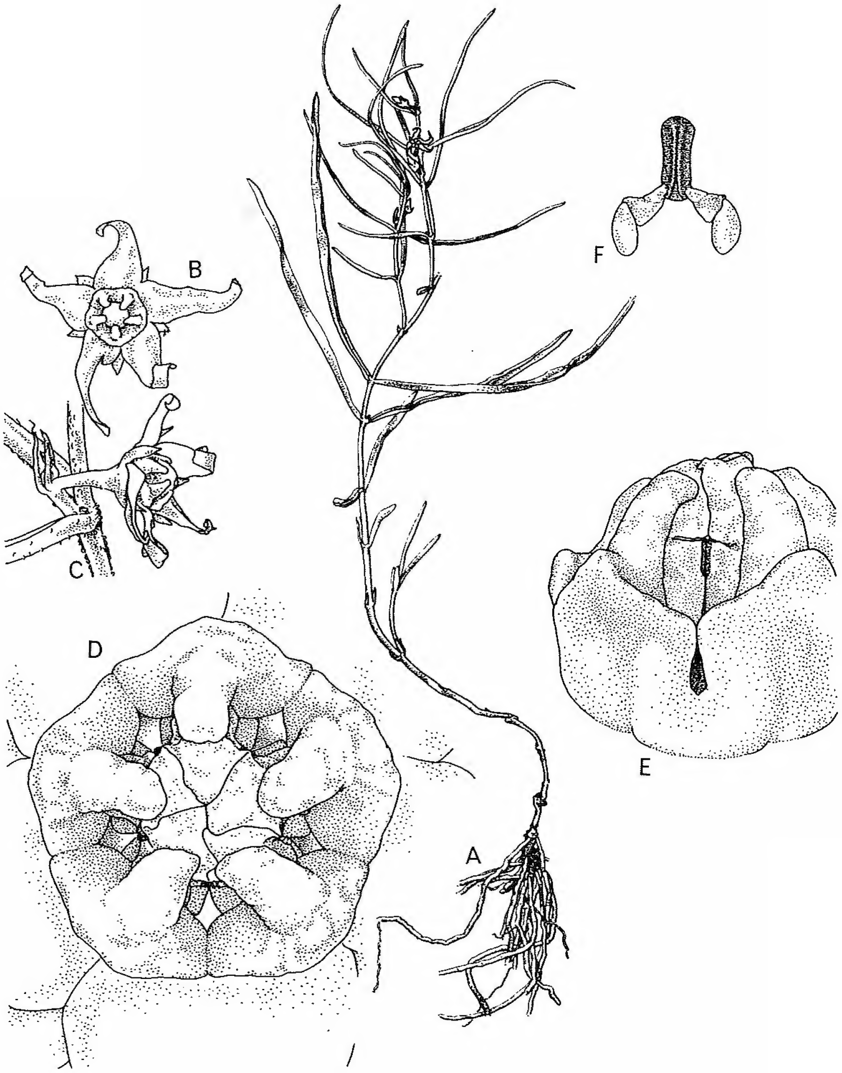

Fig. 2. *Cynanchum christineae*: A. habit × 0.5. B. apical view of flower × 3. C. view of single flowered cyme × 3. D. apical view of staminal corona and column × 19. E. lateral view of staminal corona × 19. F. pollinarium × 35. All from spirit material of Tingey AQ408486. Del. K. Harold.

Conservation status: As with *C. liebiana*, further populations may be found in suitable habitats in northern Australia. The status of the population at the Leander Bombing Range requires investigation. A conservation status of 1E is provisionally given.

Etymology: Named for Mrs Christine (Chris) Cox who together with Mrs Rita Tingey and Mrs Joyce Stobo, has made many useful collections of Asclepiadaceae from around the Darwin–Palmerston area.

SARCOSTEMMA R. Br.

Over the last few years a number of specimens in Australian herbaria have been identified as *Sarcostemma esculentum* (L.f.) Holm. While most of these specimens have been previously undetermined, those from Western Australia have usually been referred to as *Marsdenia brockmaniana* W. Fitzg. Fitzgerald (1918) provided a relatively detailed description of his new *Marsdenia*, which clearly shows that it is conspecific with *Sarcostemma esculentum*.

This species is most commonly placed in the small genus *Oxystelma* R. Br. The relegation of *Oxystelma* to subgeneric status under *Sarcostemma* by Holm (1950) has not been followed by subsequent authors (Bullock 1956; Huber 1983; Ali 1983). Both Huber and Ali take very narrow views of the genera they provided accounts of, with many of the key diagnostic characters they used representing intergrades of character states. Huber (l.c.) stated concerning *Sarcostemma* and *Oxystelma*, "the shallowly lobed corolla, the pubescent outer corona attached to the corolla and the lanceolate tips of the inner corona segments clearly distinguish [*Oxystelma* from *Sarcostemma sens. strict.*]".

However *S. insigne* (N.E. Br.) Descoings from Madagascar has a shallowly lobed corolla (Descoings 1961), but does not have a "pubescent outer corona" (in reality merely an area with hairs present) or lanceolate tipped corona lobes. Although the presence of hairs has been a much used character in distinguishing both genera and species in the Asclepiadaceae, often the presence/absence of hairs may be quite variable. This has been found in such genera as *Ceropegia* L. (Field & Collenette 1984; Bruyns 1985), *Stapelia* L. (Leach 1985), *Brachystelma* Sims (Forster 1986; Forster 1988), *Caralluma* R. Br. (Bruyns 1986, 1987) or *Marsdenia* R. Br. (Forster unpubl. data). Consequently I consider attributes of the indumentum overrated as diagnostic characters in the Asclepiadaceae.

The degree and shape of lobing of the staminal corona in the Asclepiadaceae is also variable (e.g. in *Stapelia* (Leach 1985), *Brachystelma* (Dyer 1983), *Ceropegia* (Dyer 1983; Bruyns 1985) and *Caralluma* (Bruyns 1986, 1987) and has also been greatly overrated in both specific and generic classifications of the family. When the variation of the staminal corona lobes of species in large genera like *Marsdenia*, *Ceropegia*, *Brachystelma*, *Tylophora* R. Br. and *Stapelia* L. is taken into account, the linear-tipped corona lobes in *Sarcostemma esculentum* are not all that distinctive compared with the globose lobes of other species of the genus. Hence it is considered that the corolla indumentum and linear-tipped corona lobes of *S. esculentum* are useful only in defining the species. Holm's (1950) placement of the species (in the subgenus *Oxystelma* (R. Br.) Holm) is therefore supported here.

Sarcostemma esculentum (L.f.) Holm, Ann. Missouri Bot. Gard. 37: 482 (1950); *Oxystelma esculentum* (L.f.) R. Br. ex Schultes, Syst. Veg. 6: 89 (1820); *Periploca esculenta* L.f., Suppl. pl. 168 (1781). **Type**: *Koenig*, Linnean Herbarium 307/7 (holo: LINN(microfiche!)).

Sprengel, Syst. Veg. 1: 850 (1825); Wight, Contr. bot. India 54 (1834); Hook., Companion Bot. Mag. 2: 52–53, t. 22 (1836); Decne in DC., Prod. 8: 542 (1844); Wallich, Numer. List 8219–8220 (1828–1849); Griffith, Not. pl. asiat. 4: 61 (1854); Griffith, Ic. pl. asiat. t. 399, 400 (1854); Miq., Fl. Ned. Ind. 2: 483 (1856); Dalz. & Gibson, Bombay fl. 150 (1861); Benth. in Benth. & J.D. Hook., Gen. pl. 2: 749 (1876); J.D. Hook., Fl. Brit. India 4: 17 (1885); K. Schum. in Engl. & Prantl., Nat. Pflanzenfam. 4(2): 229 (1897); Tsiang, Sunyatsenia 4: 102 (1939); Bakhuizen van den Brink, Blumea 6: 371 (1950); Backer & Bakhuizen van den Brink, Fl. Java 3: 250 (1965). H. Huber, Fl. Ceylon Handb. 1: 38 (1973); Rev. Handb. fl. Ceylon 4: 83–84 (1983); Ali, Fl. Pakistan 150: 20–23 (1983).

Oxystelma wallichii Wight, Contr. bot. India 54 (1834). **Type**: Adripas Gangis atque Irawaddi, *Wallich* (syn: K-W(microfiche!)); Pathacottah, in prov. Tanjorensi?, *Wight* (syn: K(microfiche!)).
Decne in DC., Prod. 8: 542 (1844); Wallich, Numer. List 8220 (1828–1849).

Marsdenia brockmaniana W. Fitzg., J. & Proc. Roy. Soc. Western Australia 3: 197 (1918). **synon. nov. Type:** Devils Pass, Napier Range, Western Australia, May 1905, *W.V. Fitzgerald* 626 (holo: PERTH).

Slender vine, perennial, glabrous, with white latex. Stems much branched, cylindrical, to 2 mm diameter; grey-green to green; internode length variable to 12 cm long. Leaves linear-lanceolate, glabrous, lacking extrafloral nectaries, pale green, seasonally deciduous; lamina 3–9 cm long, 3–9 mm wide; tips acute; petiole 0.5–1.3 cm long, c. 1 mm diameter. Flowers borne on top 2–6 nodes. Cymes appearing at the nodes between the pair of leaves, 1–4-flowered; peduncles 4–5 cm long, c. 1 mm diameter, pale green. Pedicels 1–2 cm long, c. 1 mm diameter, pale green. Flowers c. 7 mm long, 15–25 mm diameter; cream with irregular pale pink stripes or pale rose. Sepals 5, distinct, acute, glabrous, 2–3.5 mm long, c. 1 mm wide, generally with 1–3 glands at base on the adaxial side. Corolla shallowly campanulate to rotate, glabrous outside, lobes about as long as tube, imbricate in bud; corolline corona of dense hairs present at base adjacent to staminal column, c. 1 mm high, 4 mm diameter; petals lanceolate, 5–10 mm long, c. 7 mm wide. Staminal corona of 5 separate lobes adnate to staminal column below anthers, c. 6 mm long, 4 mm diameter; lobes ovate-lanceolate, tips incurved over anthers, c. 5 mm long and 1.5 mm wide at base, cream. Staminal column c. 4 mm long, 2 mm diameter. Anther appendages acute, c. 1 mm long, 1 mm wide. Slit between anther wings c. 2–2.5 mm long. Style-head depressed, globular, pentagonal, c. 1 mm long, 1 mm wide. Ovaries free, glabrous, c. 2.5 mm long, 1.5 mm wide. Pollinaria 1.45 mm long, 0.4 mm wide; pollinia pendulous, attached to base of corpusculum, oblong-ovoid, 1.1 mm long, 0.28–0.3 mm wide; corpusculum 0.38–0.4 mm long, 0.23–0.24 mm wide; caudicles 0.15 mm long, 0.06 mm wide. Follicles fusiform, 4–8 cm long, c. 1 cm diameter, glabrous; seed broadly ovate, tan, 3.5–4 mm long; coma white, attached to micropylar end of seed, c. 20 mm long.

Specimens examined. Sri Lanka. NORTHERN PROVINCE, MANNAR DISTRICT: c. 8 miles [13 km] NE of Mantai along the road to Pooneryni, near mile marker 14/3, Dec 1974, *Davidse & Sumithraanachchi* 9167 (BRI; PDA *n.v.*). **Australia. Western Australia.** Bank of Ord River, 5 km W of Kununurra, 15°46′S, 128°41′E, Mar 1978, *Paijmans* 2556 (CANB,PERTH); 25.3 km WSW of Mt Blythe on Charnley River, 16°23′S, 125°13′E, Feb 1989, *Kenneally* 10927 & *Hyland* (BRI,PERTH); Near Uramurdah Ck, 16°39′S, 120°25′E, Apr 1978, *Craven* 5310 (CANB); Ord River, 17°24′S, 128°52′E, Sep 1949, *Langfield* 105 (PERTH); Barker River Gorge, Oct 1921, *Gardner* 447a (PERTH); Kalumburu, Dec 1973, *Crawford* 10 (PERTH). **Northern Territory.** DARWIN AND GULF DISTRICT: "of the South Alligator", undated, *Anon.* (P, photo at BRI); Mainorn, Jan 1963, *Barlow* 623 (BRI,JCT); Peron Is, 13°11′S, 130°01′E, Oct 1974, *Henshall* 830 (ADW,CANB,DNA,MEL,NT).

Distribution and habitat: In Australia *S. esculentum* occurs in the KIMB and ARNM Regions of Barlow (1985) **(Map 2)** where it has been recorded from alluvial mulga woodland or grasslands fringing swamps.

Phenology: In Australia flowering occurs from October to March and fruiting two to four months after flowering.

Notes: The species is a popular subject for experimental purposes having been used in studies of embryology (Devi & Lakshminarayana 1977), chemistry (Trivedi *et al.* 1988), leaf venation (Mohan & Inamdar 1984), plasmodesmata in trichomes (Inamdar *et al.* 1973) and floral anatomy (Rao & Ganguli 1963; Puri & Shiam 1966).

Conservation status: Not endangered, vulnerable or rare in Australia at present. *S. esculentum* is widely distributed in Egypt, Pakistan, India, Iraq, Sri Lanka, China, Thailand, Burma and Indonesia (Tsiang 1939; Backer & Bakhuizen van den Brink 1965; Ali 1983; Huber 1983).

TYLOPHORA **R. Br.**

Tylophora erecta F. Muell. ex Benth. and *T. macrophylla* Benth. were published simultaneously by Bentham (1869) with two syntypes cited for each respectively. Bentham distinguished his two taxa in the accompanying species key:

"Leaves narrow-lanceolate . . . . 1. *T. erecta*
Leaves ovate-lanceolate . . . . 2. *T. macrophylla*"

In his two descriptions, the only other difference seems to be corolla size, with *T. macrophylla* having only slightly larger flowers.

Wide variation in leaf size occurs in material identified as *T. erecta* and *T. macrophylla* in herbaria. Leaf lamina length and width in relation to stem node number was examined in material of *Forster & Bolton* 3707, a large multiple collection from four different plants within the same population. Lamina length/width ratio was found to be relatively constant (**Fig. 3A**). Leaf lamina length and lamina width were found to increase until node 4 below the stem apex after which both were relatively constant (**Fig. 3B,C**). Considerable variation occurred in these dimensions. Hence the size of a particular leaf on a *T. erecta* individual (and consequently on an herbarium specimen) may be dependent on both the conditions under which growth occurred and also the number of nodes available for examination. For small specimens with few nodes the larger leaves towards the base of the stem tend to be absent. Therefore the leaf shape difference given by Bentham (1869) to distinguish species, which is dependent on the lamina length/width ratio is not considered a valid distinguishing feature.

Flower size was found to be variable within populations (e.g. *Forster & Bolton* 3705A–D; *Forster & Bolton* 3707A–D) with the corolla diameter varying from 9–12 mm and petals 4–6 mm long. Therefore the difference in scale given by Bentham (*viz* 3 lines diameter for *T. erecta* versus nearly 4 lines diameter for *T. macrophylla*) is not sufficient for the recognition of two species.

Tylophora erecta F. Muell. ex Benth., Fl. austral. 4: 334 (1869); *Vincetoxicum erectum* (F. Muell. ex Benth.) O. Kuntze, Revis. gen. pl. 2: 424 (1891). **Type**: Burdekin River, undated, *F. von Mueller* (syn: K(photo!); isosyn: MEL(MEL 113602)); Sellheim & Bowen Rivers, undated, *Bowman* (syn: K, both on same sheet(photo!); isosyn: MEL(MEL 113604 in part, excl. Nebo River); MEL(Sellheim River, MEL 113603)).

F. Muell., Fragm. 9: 71 (1875); Fragm. 11: 79 (1878); Syst. census Austral. pl. 94 (1882); Second syst. census Austral. pl. 158 (1889); Bailey, Syn. Queensl. fl. 316 (1883); Catal. pl. Queensl. 30 (1890); Bailey, Queensl. fl. 3: 1005 (1900); Compr. cat. Queensl. pl. 326 (1913); Domin, Biblioth. Bot. 89 (6): 1085–1086 (1920); Williams, Native pl. Queensland 3: 310–311 (1988).

Tylophora macrophylla Benth., Fl. austral. 4: 334 (1869); *Vincetoxicum benthamiana* O. Kuntze, Revis. gen. pl. 2: 424 (1891) **synon. nov.** non *V. macrophylla* Sieber & Zucc. (1846). **Type**: Port Essington, Feb 1839, *Armstrong* (syn: K(photo!)); Adam's Bay, undated, *Hulls* (syn: MEL(MEL 113619)).

Tylophora stelligera Schltr., Bot. Jahrb. Syst. 40, Beibl. 92: 5 (1908). **synon. nov. Type**: Islands of Torres Strait, *Hartmann* (holo: B†; iso: MEL(MEL 113610)).

Woody erect perennial, with dense indumentum of uniseriate yellow hairs; with yellow latex. Stems cylindrical, c. 1 m high, 1–4 mm diameter, yellowish green to grey-green; up to 30 nodes on flowering plants; internode length variable to 8 cm. Leaves linear-lanceolate to ovate-elliptical; lamina up to 14 cm long and 6 cm wide, upper surface yellowish green to grey-green, paler beneath; petiole 5–8 mm long and 1 mm wide; 4 extrafloral nectaries at lamina base. Flowers borne on upper 2–10 nodes. Cymes appearing at the nodes between the pair of leaves, 1-many-flowered; peduncle 10–60 mm long, 1–1.5 mm diameter, pale green. Pedicels 6–10 mm long, c. 1 mm diameter, pale green. Flower 3–4 mm long, 9–12 mm diameter; tube up to 1 mm deep; dark brown, tan, red, reddish brown or green. Sepals 5, distinct, lanceolate 3–4 mm long, 1–1.5 mm wide, generally with 3 or 4 glands at the base on the adaxial side. Petals 5, distinct, ovate-lanceolate, externally pubescent with white cilia, internally glabrous or with sparse white cilia, 4–6 mm long, 2.5–4 mm wide. Corona of 5 separate lobes adnate to staminal column below anthers, 0.5–1 mm long, 2.5–3 mm diameter; lobes rounded, c. 0.75 mm long, 0.5 mm wide, dark brown, tan, red, reddish brown or green. Staminal column c. 1.5 mm long, 1 mm diameter. Anther appendages obtuse, c. 0.25 mm long, 0.5 mm wide. Slit between anther wings c. 0.25 mm long. Style-head depressed globose, with a bifid style, 0.5–1.0 mm longer than staminal column, 1–1.25 mm diameter, pale green.

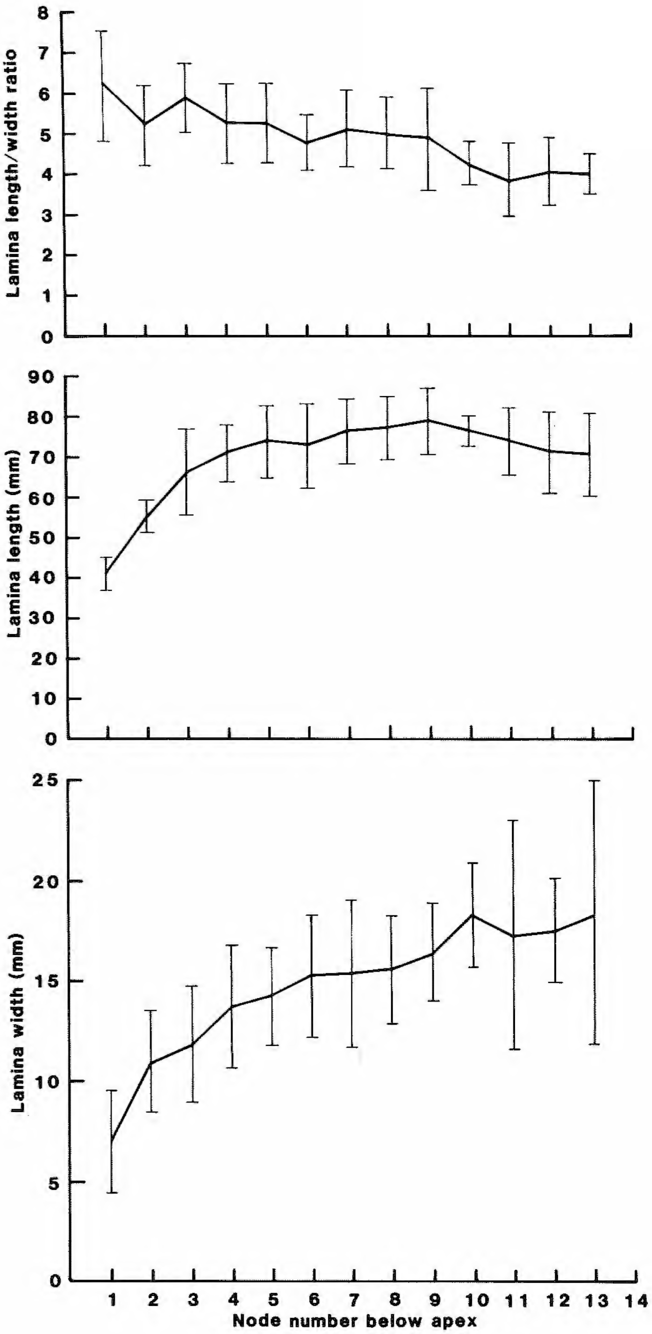

Fig. 3. *Tylophora erecta*: A. lamina length/width ratio versus node number below apex. B. lamina length versus node number below apex. C. lamina width versus node number below apex. All from Forster 3707. Del. L. Jessup.

Pollinaria c. 0.15 mm long, 0.20 mm wide; pollinia globose, held erect, 0.13–0.15 mm long, 0.11 mm wide, golden; corpusculum oblong, 0.06 mm long, 0.03 mm wide, tan; caudicle 0.04 mm long, 0.01 mm wide. Ovaries free, glabrous, c. 1 mm long and 1.25 mm wide. Follicles fusiform, 5–11 cm long, 12–22 mm wide; seed oblong, tan, c. 6 mm long and 4 mm wide; coma white, attached to germinating end of seed, c. 20 mm long. **Figs 4 & 5.**

Selected specimens: **Northern Territory**. Old Marrakai Track, 47 mile, Stuart Hwy, 12°54′S, 131°10′E, Dec 1987, *Cox* [AQ408474] (BRI*); Marlowe's Lagoon, Palmerston, Dec 1987, *Tingey* [AQ408476] (BRI*); Adelaide River Camp, 13°15′S, 131°10′E, Aug 1946, *Blake* 16688 (BRI); Bank of Daly River, 13°53′S, 130°48′E, Jul 1946, *Blake* 16481 (BRI); near Bull Ck, 13°53′S, 131°16′E, Jul 1946, *Blake* 16286 (BRI); near Beatrice Hill, 12°38′S, 131°16′E, Sep 1946, *Blake* 16980 (BRI). **Queensland**. COOK DISTRICT: 1.3 km N of Duckholes Ck crossing, Peninsula Road, 14°24′S, 143°22′E, Apr 1988, *Forster* 4252 & *Liddle* (BRI*,CANB,K); 4.5 km N of old homestead site on Cape York Rd, Lockerbie, Sep 1985, *Williams* 85199 (BRI); Just E of Myall Ck on the road from Weipa to Sudley, 12°39′S, 142°16′E, Aug 1983, *Clarkson* 4886 (BRI,QRS); Laradeeniya Ck, Sep 1963, *Stephens* [AQ431122] (BRI); 3 km W of Peninsula Development Rd on track to Kooburra Stn, 15°18′S, 143°58′E, Apr 1980, *Clarkson* 3151 (BRI); 11 km W of Peninsula Development Rd on track to New Dixie Stn, 15°01′S, 143°30′E, Apr 1980, *Clarkson* 3137 (BRI); Archer Bend N.P., 13°39′S, 141°20′E, Aug 1981, *Morton* AM1308 (BRI); Long Scrub, Bamaga, 1962, *Webb & Tracey* 6921 (BRI,CANB). BURKE DISTRICT: Chudleigh Park, Oct 1961, *Copeman* [AQ216955] (BRI). NORTH KENNEDY DISTRICT: 16 km past "Lolworth" HS on Pentland Rd, 20°17′S, 145°00′E, Mar 1988, *Forster* 3705A–D & *Bolton* (BRI*,CANB,K,MO); 3.7 km by road NE of Ravenswood, 20°05′S, 146°55′E, Mar 1988, *Forster* 3707A–D & *Bolton* (BRI*,CANB,K,MO); Scrubby Ck, S of Rishton Scrub, 20°11′S, 146°34′E, Mar 1988, *Forster* 3776 (BRI*,CANB,K); 2.5 miles [4 km] NW of Collinsville, 20°30′S, 147°50′E, Nov 1968, *Ozanne* [AQ216959] (BRI). SOUTH KENNEDY DISTRICT: Collinsville Coal Company Lease area, Jun 1984, *Thompson* C161 (BRI). LEICHHARDT DISTRICT: Southern end of Lake Elphinstone, c. 6 km from road to Glenden, 21°33′S, 148°13′E, Jul 1986, *Champion* 173 (BRI).

Distribution and habitat: The species occurs in the ARNM, CARP, CYRK and BURD Regions of Barlow (1985) **(Map 1)**. Collections have been recorded from reddish lateritic soils or pale grey podsols in open eucalypt forest in association with overstorey taxa such as *Eucalyptus confertiflora* and *Erythrophleum chlorostachys* on Cape York Peninsula or with *Eucalyptus quadricostata* near Pentland or *Eucalyptus crebra* near Ravenswood.

Phenology: Flowering occurs from November to April, fruiting from March to June.

Notes: The species has been implicated in cases of scouring in calves (*Ozanne* AQ216959) and pounded roots were reputedly used as an remedy for toothache by aborigines (*Stephens* AQ431122).

Conservation status: *T. erecta* is widespread in north tropical Australia and is not endangered at present.

When Bentham (1869) described *Tylophora floribunda* for a taxon that occurs on the east coast of Australia, he was obviously unaware of *T. floribunda* Miq. from Asia. Subsequently Blake (1948) provided a new name, *T. crebriflora* for the Australian species and this has universally been used since. However Tsiang (1936) had already recognised the illegitimacy of Bentham's name and substituted *T. benthamii* for Bentham's species. The synonymy is thus as follows.

Tylophora benthamii Tsiang, Sunyatsenia 3: 231 (1936); *Tylophora floribunda* Benth., Fl. austral. 4: 335 (1869), non Miq., Ann. Mus. Bot. 2: 128 (1866); *Vincetoxicum polyanthum* O. Kuntze, Revis. gen. pl. 2: 424 (1891); *Tylophora crebriflora* S.T. Blake, Proc. Roy. Soc. Queensl. 59: 168 (1948) nom. superfl. non *Vincetoxicum polyanthum* K. Schum., Bot. Jahrb. Syst. 17: 136 (1893); non *Tylophora polyantha* Volkens, Bot. Jahrb. Syst. 31: 473 (1902). **Type**: Mount Warning, Tweed River, undated, *C. Moore* (holo: MEL(MEL 113591)).

Williams & Harden, Rainforest Climbing Pl. 37 (1980); Jacobs & Pickard, Pl. New South Wales 70 (1981); Williams, Students fl. N. E. New South Wales 5: 729–730 (1984); Stanley & Ross, Fl. S. E. Queensland 2: 313 (1986); Jones & Gray, Climbing pl. Austral. 351, 355 (1988); Williams, Native pl. Queensland 3: 310–311 (1988).

Woody perennial liane, with dense to sparse indumentum of uniseriate hairs; with yellow latex. Stems erect, cylindrical, twining; grey green becoming corky with age, to 2 cm diameter; internode length variable to 13 cm long. Leaves petiolate; lamina broadly ovate to elliptic with base cordate, rounded or truncate and tip mucronate or abruptly acuminate, 4–12 cm long, 2.5–8 cm wide, 5–7 main veins prominent below, deep glossy green above, pale green to bluish-green below, sparsely pubescent to glabrous above,

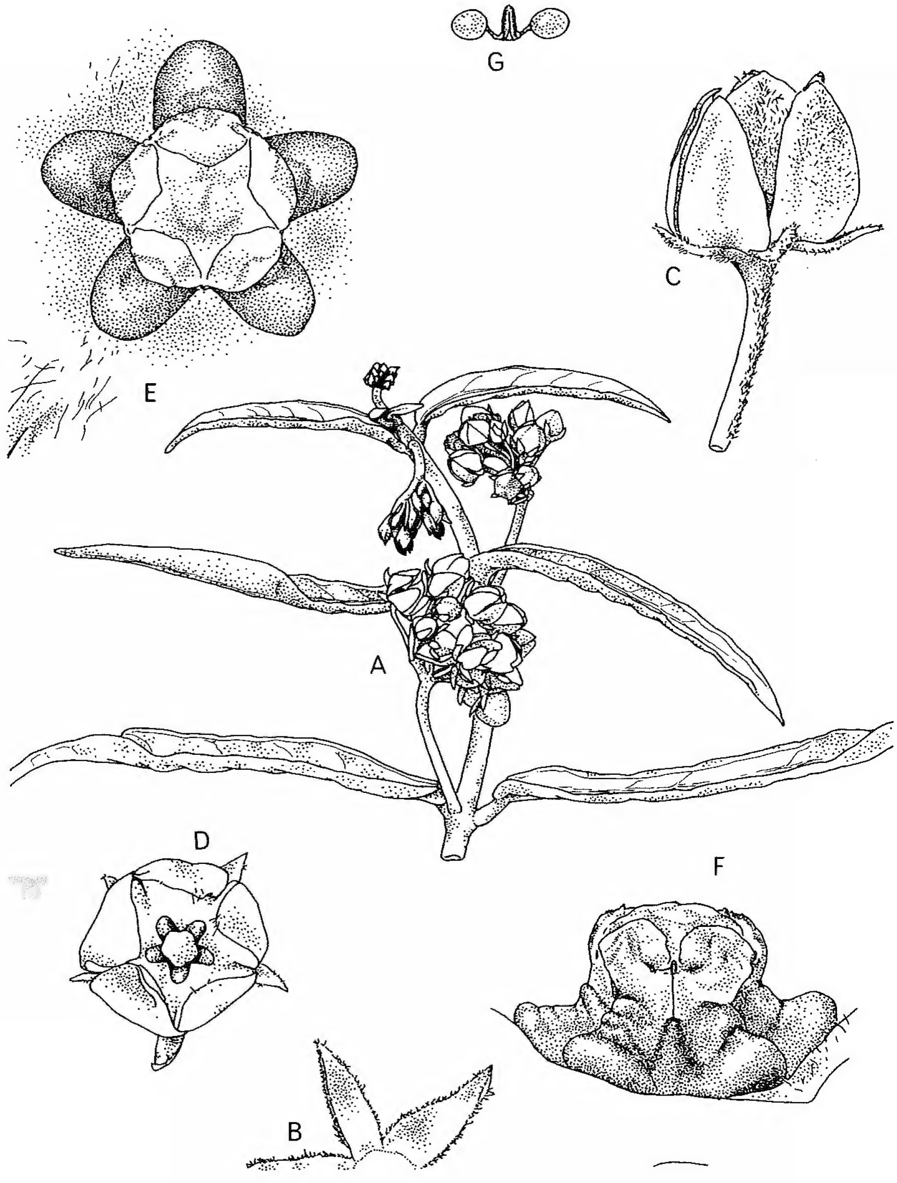

Fig. 4. *Tylophora erecta*: A. habit × 1. B. apical view of part of calyx × 5. C. lateral view of flower × 4.5. D. apical view of flower × 4.5. E. apical view of staminal corona and staminal column and representative hairs on corolla × 21. F. lateral view of staminal corona and staminal column × 21. G. pollinarium × 37. All from spirit material of Forster 3705A & Bolton. Del. K. Harold.

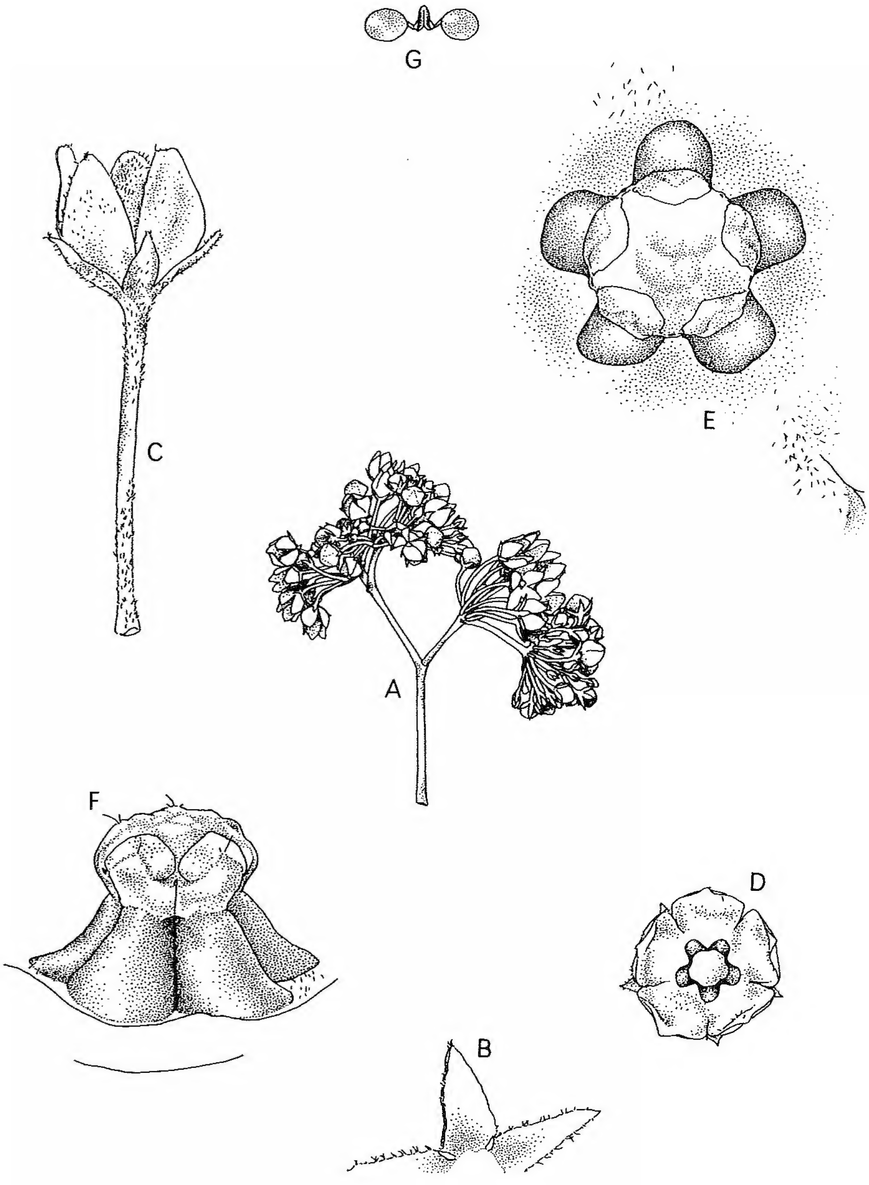

Fig. 5. *Tylophora erecta*: A. compound cyme × 1. B. apical view of part of calyx × 7. C. lateral view of flower × 4.5. (Note: entire surface pubescent except for a few broad interior corolla margins.) D. apical view of flower × 4.5. E. apical view of staminal column and staminal corona × 21. F. lateral view of staminal corona and staminal column × 21. G. pollinarium × 37. All from spirit material of Forster 4252 & Liddle. Del. K. Harold.

sparsely to densely pubescent below; petiole 10–33 mm long, c. 1 mm diameter; 2–9 extrafloral nectaries at lamina base. Flowers borne on upper 2–5 nodes. Cymes appearing at the nodes between the pairs of leaves; 1–many-flowered, up to 8 cm wide; bracts on cyme, linear-lanceolate, c. 4 mm long, 0.5 mm wide; peduncle to 15 mm long, c. 1 mm diameter, pale green; pubescent. Pedicels 7–15 mm long, 0.5–1 mm diameter, pubescent, light green. Flowers rotate, purple, brown or red, 3–7 mm long, 7–11 mm diameter; tube up to 2 mm deep. Sepals 5, distinct, linear-lanceolate, 2.5–4 mm long, 1–1.5 mm wide, sparsely pubescent externally; generally with 1–2 glands at the base on the adaxial side. Petals 5, distinct, lanceolate, 3–5 mm long, 2–3 mm wide, finely pubescent externally and internally. Corona of 5 separate lobes adnate to staminal column below anthers, 1–2 mm long, 1.5–4 mm diameter; lobes flattened, tongue shaped, 1.5–1.75 mm long, 0.75–1 mm wide; same colour as corolla. Staminal column 1–2 mm long, c. 1.5 mm diameter. Anther appendages ovate-obtuse, c. 0.25–0.5 mm long, c. 0.25–0.5 mm wide. Slit between anther wings 0.25–0.4 mm long. Style-head flattened pentagonal, with a bifid style, c. 1.5 mm wide, pale green, 0.5–1.0 mm longer than staminal column. Pollinaria 0.15–0.16 mm long, 0.3–0.4 mm wide; pollinia globose, held horizontally to erect, 0.13–0.15 mm long, 0.12–0.15 mm wide, golden; corpusculum oblong, tan, c. 0.10 mm long, 0.05 mm wide; caudicles unwinged, 0.05–0.07 mm long, 0.01 mm wide. Ovaries free, few sparse hairs, c. 2 mm long, 1.5 mm wide. Follicles fusiform, 9–12 cm long, 1–2 cm wide; seed oblong, tan, 8–9 mm long, 4 mm wide; coma 20–25 mm long, attached to germinating end of seed. **Fig. 6**.

Selected specimens: Northern Territory. Darwin and Gulf District: Murganella Area, 11°26′S, 132°58′E, Feb 1984, *Jones* 1387 (BRI,DNA*); 6 km S of Brogden Pt, Murganella, 11°34′S, 133°04′E, Mar 1987, *Russell-Smith* 1985 & *Lucas* (BRI,DNA*); Little Nourlangie Rock, 12°52′S, 132°48′E, May 1978, *Dunlop* 4826 (DNA); Lightning Dreaming, Arnhemland, 12°55′S, 133°02′E, Feb 1984, *Dunlop* 6592 & *Wightman* (DNA); East Alligator River, 10 km S of Cannon Hill Ranger Stn, 12°27′S, 132°58′E, May 1980, *Craven* 6010 (CANB,DNA); Katherine Gorge N.P., 14°19′S, 132°28′E, Jun 1983, *King* 237 (DNA); Liverpool River mouth, Tudor Pt, 11°59′S, 134°15′E, Jun 1987, *Russell-Smith* 2564 & *Lucas* (DNA); Cobourg Peninsula, 11°09′S, 132°09′E, Jul 1982, *Wightman* 137 & *Dunlop* (DNA); Goomadeer: Gundjumbul outlier, 12°04′S, 133°44′E, Oct 1987, *Russell-Smith* 3834 & *Lucas* (DNA). **Queensland.** Cook District: Tolga, Nov 1985, *Williams* 85310 (BRI); Bamaga, c. 27 km SW of Cape York, Oct 1965, *Smith* 12664 (BRI); cult. ex S.F.R. 144, 16°17′S, 145°05′E, Nov 1978, *Gray* 1120 (QRS*); Wongabel, 17°20′S, 145°28′E, Sep 1957, *Smith* 10171 (BRI). North Kennedy District: Wilkin Hill, Hinchinbrook Is, 18°16′S, 146°14′E, May 1972, *Webb & Tracey* 12006 (BRI,CANB); Tully, Dec 1949, *Clemens* [AQ217019] (BRI). Wide Bay District: Mt Allan, Booloumba Ck S.F.R. near Kenilworth, Mar 1987, *Sharpe* 4659 (BRI*); Cold Ck, S.F. 301, 25°53′S, 152°24′E, Nov 1988, *Forster* 4839 (BRI*). Moreton District: W Slopes of Mt Roberts, McPherson Range, Mar 1945, *Blake* 15483 (BRI); c. 1 km S of Coolum Beach P.O., Apr 1978, *Sharpe* 2486 (BRI). **New South Wales.** Fingal Head, May 1967, *Blake* 22789 (BRI).

Distribution and habitat: Near the coast from Sawtell in New South Wales to the top of Cape York Peninsula in Queensland and into the north of the Northern Territory which equates to the MCPH, CYRK, BURD, ARNM and DWSN Regions of Barlow (1985) (**Map 2**). It occurs in a wide variety of rainforest types from littoral rainforest at low altitudes to higher altitude rainforests on the Atherton Tableland (e.g. Tolga and Wongabel).

Phenology: Flowering and fruiting throughout the year.

Conservation status: While the species is widespread in northern Australia, it is markedly disjunct and very rarely encountered in southeastern Queensland and northeastern New South Wales. It is not endangered, threatened or vulnerable at this stage.

SARCOLOBUS R. Br.

In his revision of *Sarcolobus* R. Br., Rintz (1980) lists the type citation for *S. ciliolatus* as being "Moluccas, Aroe & Kei Is., Warburg 21317" with an isotype being present at A. Material labelled *S. ciliolatus* Warb. (a synonym of *S. retusus* K. Schum.) exists at BRI with the label information "Plants of Key Arch. 1889 Warburg 21317". There have been numerous examples of specimens with different label information forming part of the same collection in material collected during the 19th century, especially with duplicated collections at different herbaria (Merrill 1915). If the collections have identical collection numbers (as opposed to the species numbers used by some collectors, which generally do not run into 5 digits) and are of the same species, and there is no information available on the location of duplicates, it is reasonable to assume that they represent the same collection. The BRI material of Warburg 21317 is referable to *S. retusus* and is therefore considered to represent an isotype of *S. ciliolatus*.

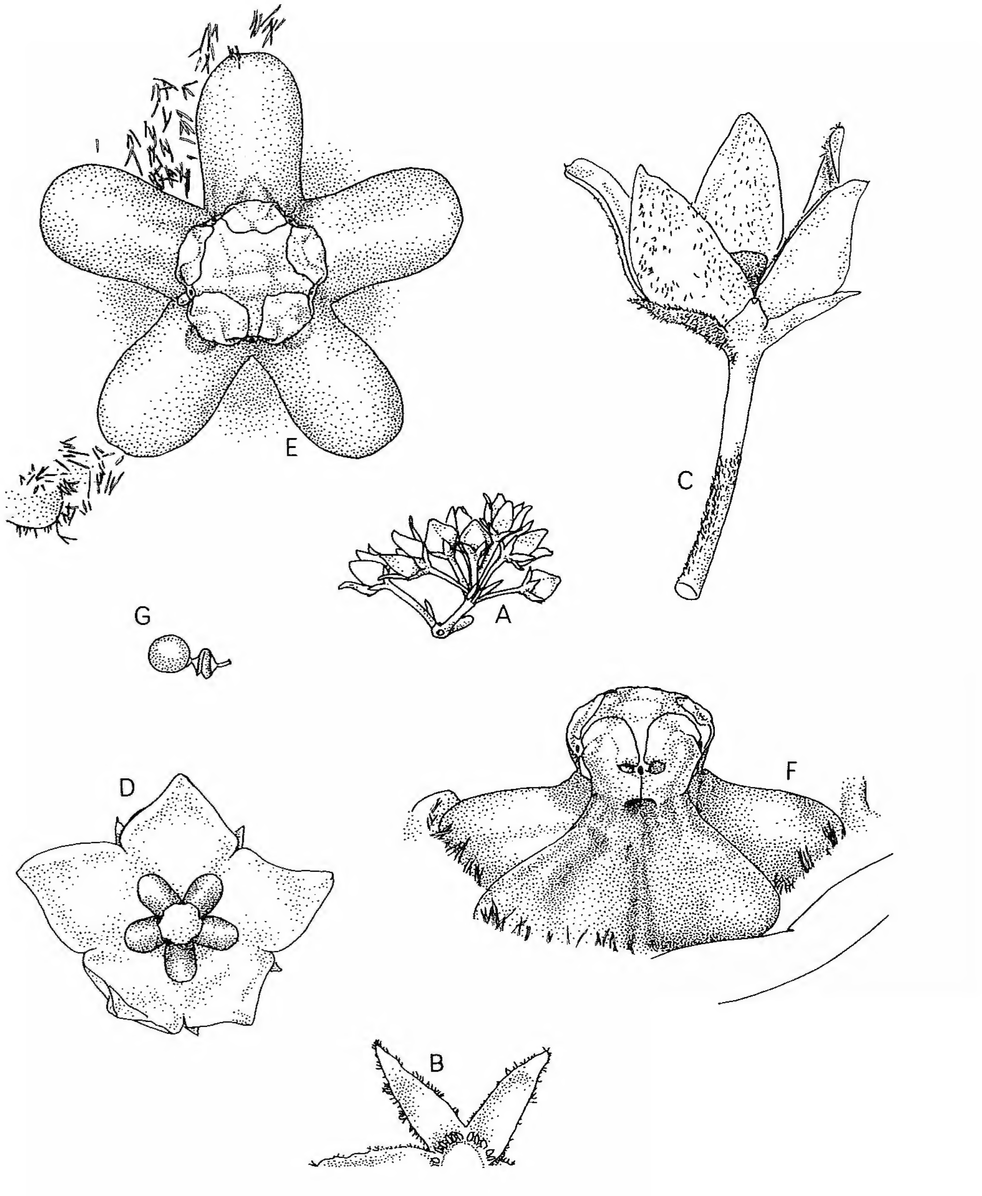

Fig. 6. *Tylophora benthamii*: A. part of cyme × 1. B. apical view of part of calyx showing glands × 5. C. lateral view of flower × 4.5. (Note: entire surface pubescent except for a few broad interior corolla margins.) D. apical view of flower × 4.5. E. apical view of staminal corona and staminal column, showing some hairs on corolla × 15. F. lateral view of staminal corona and staminal column showing hairs at base of staminal corona × 15. G. pollinarium (lacking 1 pollinium) × 37. All from Gray 1534. Del. K. Harold.

Isotype material of *S. oblongus* Rintz also exists at BRI in addition to the holotype (A) and isotypes (BM,L) listed by Rintz (l.c.: 77). Rintz cited material only from the southern coast of Papua New Guinea, from the Fly River and Purari River deltas. *S. oblongus* also occurs in the Solomon Islands and the northern coast of Papua New Guinea.

Specimens examined: Papua New Guinea. Western District: Daru Is, Mar 1936, *Brass* 6278 (BRI; A *n.v.*), Sep 1972, *Streimann & Lelean* NGF18424 (BRI; CANB,L,LAE *n.v.*). Madang District: Madang, *Croft & Galore* LAE71097 (BRI; A,CANB,K,L,LAE *n.v.*). Gulf District: Uramu Is, 7°30'S, 144°30'E, Jul 1955, *Gray & Floyd* NGF8032 (BRI; LAE *n.v.*). **Solomon Islands.** Meringe Lagoon, Isabel [Santa Isabel Island], Nov 1932, *Brass* 3156 (BRI; A *n.v.*).

FINLAYSONIA Wall. (subfamily Periplocoideae)

The monotypic genus *Finlaysonia* was first described by Wallich (1831) who also provided an excellent coloured plate and detailed description of *F. obovata* Wallich.

F. obovata, though until now considered non Australian, does occur in Australia and represents a third genus in the subfamily Periplocoideae. *Finlaysonia* may be distinguished from *Cryptostegia* R. Br. and *Gymnanthera* R. Br. by the following key.

1. Corolla without tube; lobes pubescent . . . . **Finlaysonia**
Corolla with tube; lobes glabrous 2

2. Corona lobes broad, cusped or toothed; corolla tube cylindrical . . **Gymnanthera**
Corona lobes pointed or forked; corolla tube funnel-shaped . . . . . . **Cryptostegia**

Finlaysonia Wallich, Pl. asiat. rar. 2: 48, t. 162 (1831). **Type**: *F. obovata* Wallich
Wight, Contr. bot. India 65 (1834); Decne in DC., Prod. 8: 494 (1844); Miq., Fl. Ned. Ind. 2: 464–465 (1856); Griffith, Notul. pl. asiat. 4: 70 (1854); Benth. in Benth. & J.D. Hook., Gen. pl. 743 (1876); J.D. Hook., Fl. Brit. India 4: 7–8 (1885); K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(2): 211 (1897); Merr., Interpr. Herb. amboin. 434 (1917), Sp. blancoan. 314 (1918), Enum. Philipp. fl. pl. 339 (1923); Ridley, Fl. Malay Penins. 2: 373 (1923); Backer & Bakhuizen van den Brink, Fl. Java 2: 248 (1965).

Woody liane with white latex. Stems twining, glabrous; with papery bark. Leaves slightly fleshy, glabrous, opposite, margins entire, lacking extrafloral nectaries at lamina base. Inflorescence appearing at nodes between the pair of leaves, cymes with 1–many flowers. Sepals 5, distinct, without glands at base. Corolla rotate; petals 5, distinct, lobes overlapping to right in bud. Corolline corona of 5 filiform-subulate lobes inserted adnate to the stamens. Stamens inserted in corolla throat, filaments free, not alternating with corona lobes; anthers with inflexed membranous tip. Pollinaria comprising a granular mass with 2 pollen masses in each anther cell; translators erect, dilated. Follicles widely divergent, ovoid with a narrow base and hooked acuminate top, ribbed. Seed smooth; coma short, reflexed.

Finlaysonia obovata Wallich, Pl. asiat. rar. 2: 48, t. 162(1831), Numer. List 4466 (1831). **Type**: Kaluen River, 2 December 1827 (syn: K-W(4466A, photo!)); Sundriban 23 Sep 1809, ex Hb. Ham. (syn: K-W(4466B, photo!)).

Tabernaemontana cirrhosa Blanco, Fl. Filip. 115 (1837). **Type**: not designated.
Blanco, Fl. Filip. Ed. 2, 83 (1845), Ed. 3. 1: 152 (1877); A. DC., Prod. 8: 377 (1844); Merr., Sp. blancoan. 314 (1918).

[*Finlaysonia maritima* auct. non Backer ex K. Heyne: Heyne, Nutt. pl. Ned.-Ind. ed. 2, 2: 1293 (1927).]

Stems to 8 mm diameter. Leaves petiolate; lamina obovate-oblong, oblanceolate or elliptic, 40–125 mm long, 16–60 mm wide; base cuneate to acute, tip obtuse or apiculate; dark glossy green above, paler beneath, coriaceous, conspicuously reticulate-veined beneath; petioles 7–20 mm long, c. 1 mm diameter, top grooved, with an occasional uniseriate hair. Inflorescence with sparse to dense uniseriate hairs, up to 10 cm wide. Peduncle with occasional uniseriate hairs, to 2 mm diameter; bracts ovate, with scattered uniseriate hairs on edge, c. 1 mm long, 1.5 mm wide. Flower to 15 mm diameter, c. 5 mm long. Sepals ovate, uniseriate hairs on edge, c. 1.5 mm long, 2 mm wide. Petals c. 7 mm long, 5 mm wide, yellow-brown to green, lower surface glabrous, upper surface with lower 4 mm covered in dense uniseriate multicellular hairs. Corona c. 2.5 mm long, 4 mm diameter, consisting of 5 separate lobes/filaments fused to base of corolla lobes; each lobe rounded at base, c. 1.5 mm diameter, linear-subulate above for c. 3.5 mm in length and 0.25 mm diameter. Stamens fused to base of corolla filament, not connate, enclosing stigma; individual stamens c. 1.5 mm long, 0.75 mm wide; slit between anther wings c. 0.75 mm long. Style-head on stalked style, c. 1 mm long, 1 mm diameter. Pollen mass c. 0.5 mm long, 0.25 mm wide. Follicles ribbed, 5–8 cm long. Seed ovate, tan, c. 18 mm long, 10 mm wide; coma around the entire seed edge, c. 10 mm long. **Fig. 7.**

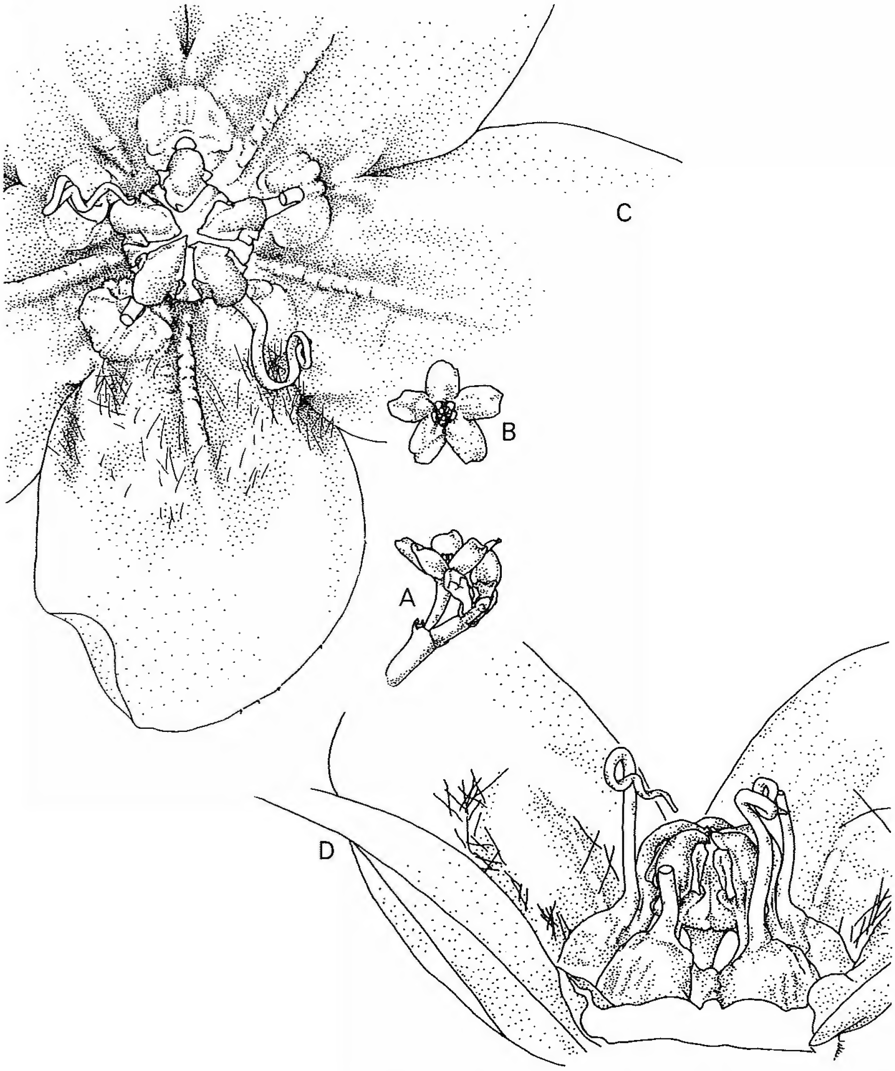

Fig. 7. *Finlaysonia obovata*: A. single fascicle from cyme × 1. B. apical view of flower × 1. C. apical view of flower showing detail of staminal column, corona lobes and hairs on corolla (several corona lobes lacking upper part) × 10. D. lateral view of flower showing detail of staminal column, corona lobes and hairs on corolla (several corona lobes lacking upper part) × 10. All from spirit material of Craven 6559. Del. K. Harold.

Specimens examined: Singapore. Kranji Nature Reserve, 14 1/2 m [23.2 km] Woodlands Road, Aug 1965, *Ngadiman* HMB376 (BRI; SING *n.v.*). **Papua New Guinea**. GULF DISTRICT: Kinomeri Village, Uramu Is, 7°30′S, 144°30′E, Jun 1955, *Gray & Floyd* NGF8009 (BRI; LAE *n.v.*); Paia Village near mouth of Omati River, Jan 1955, *Womersley & Simmonds* NGF5060 (BRI; LAE *n.v.*); Tributary of Era River, 7°25′S, 144°46′E, Apr 1974, *Croft & Vinas* LAE61302 (CANB; L,LAE *n.v.*). WESTERN DIVISION: Daru Is, Feb 1936, *Brass* 6226 (BRI; A *n.v.*); Upper Wassi Kussa River (left branch), Jan 1936, *Brass* 8623 (BRI; A *n.v.*); Sabi, lower Wassi Kussa River, 9°05′S, 142°00′E, Jun 1973, *Henty* NGF49645 (BRI; A,CANB,L,LAE *n.v.*). **Australia. Northern Territory.** East Alligator River, 19.5 km NW of Cannon Hill Ranger Stn, 12°14′S, 132°49.5′E, Jun 1980, *Craven* 6434 (CANB); ditto, Mar 1981, *Craven* 6559 (CANB*).

Distribution and habitat: The species is widely distributed in India, South-east Asia, Philippine Islands, New Guinea and known from a single locality in the Northern Territory of Australia in the ARNM region of Barlow (1985) (**Map 3**). It grows as a twiner among mangroves or in fringing forest, often inundated by water at high tide. In Australia it is recorded from cracking clay on a semi-saline floodplain with mixed grasses and herbs.

Phenology: Flowering in March and probably earlier. Wallich (1831) records August to October in the northern hemisphere. Fruiting in June. Wallich (l.c.) records November in the northern hemisphere.

Notes: There are two sheets in the Wallich herbarium at Kew (K-W) that are relevant to typification of *Finlaysonia obovata*. The protologue lists *Gurua obovata* Herb. Hamilton as a synonym and states the species as "Crescit ad litora aestuariorum Gangis, Irawaddi et fluminum Martabaniae, florens Augusto–Octobre, fructifera Novembre.". From Wallich's contemporaneous Numerical List, the following label has been attached to sheet 4466A in K-W:

> "4466 Finlaysonia obovata Wall
> A Rupe fl. Martabonia 1827
> B Gurua obovata HHam. [= herb. Hamilton] e Sunderban".

Both sheets A and B are therefore regarded as syntypes of Wallich's name. As both sheets represent the same taxon, a lectotype is not selected here.

Material of *F. obovata* from Java was erroneously included under the name *F. maritima* Backer ex Heyne by Heyne (1927). That name was based on *Secamone maritima* Blume which applies to a species of *Toxocarpus* and is not referable to *Finlaysonia* (Bakhuizen van den Brink 1950).

Conservation status: Apparently of restricted occurrence in Australia. Surveys of the mangrove communities of northern Australia are required to ascertain the extent of this species' occurrence in Australia.

GYMNEMA R. Br.

Bentham (1869) did not accept *Gymnema geminatum* R. Br. for Australia, placing the name in synonymy under "*Gymnema sylvestre* R. Br." with the comment "The species is also in Ceylon and the Indian Peninsula, and has probably a much wider range in tropical Asia. R. Brown indicated the close resemblance of the Australian to the Indian plant; and, after a careful analysis of the flowers of both, I can detect no character to separate them unless the scales of the corolla may be slightly more decurrent in the former than in the latter." This name was not validly published until 1820 by Schultes so *G. geminatum* therefore has priority over *G. sylvestre.* Bailey (1900) followed Bentham in accepting "*G. sylvestre* R. Br." and added another species, *G. pleiadenium* F. Muell., described by von Mueller in (1878). *G. pleiadenium* and *G. sylvestre sensu* Benth. were distinguished by Bailey with the following key.

"Leaves ovate to ovate-lanceolate. Umbels mostly in pairs . . . . 1. *G. sylvestre*
Leaves ovate, shortly acuminate, with many superficial glands at the base. Umbels mostly solitary . . . . 2. *G. pleiadenium*"

Examination of the type sheet of *G. pleiadenium* F. Muell. has found it to be synonymous with the species described as *G. dunnii* (Maiden & Betche) P. Forster (Forster 1987) and is hence the prior name. Examination of the type sheet of *G. sylvestre* (Retz.) R. Br. ex Schultes **(Fig. 8)** and other material from India has shown that the Australian plants are specifically distinct. Vegetative material of *G. sylvestre* is almost indistinguishable from that of *G. pleiadenium*; however a number of floral and vegetative differences may be used to distinguish both these species and *G. geminatum* (**Table 2**).

There are no comprehensive published descriptions of *G. sylvestre* and none of the specimens cited here have mature fruits, but Hooker (1885) states that the follicles are slender and terete and the immature follicle on *Thomson* AQ217135 (BRI) is similar to those of *G. pleiadenium*. *G. pleiadenium* has fusiform follicles whereas *G. geminatum* has fusiform to ovoid follicles. *G. sylvestre* (Retz.) R. Br. ex Schultes appears closely related to both *G. pleiadenium* and *G. geminatum* but differs in a number of significant ways as outlined above.

Table 2. Comparison of major distinguishing characters of *Gymnema sylvestre, G. pleiadenium* and *G. geminatum.*

Character	*G. sylvestre*	*G. pleiadenium*	*G. geminatum*
secondary venation	obscure	obscure	prominent
Corolla tube length	c. 1.5 mm	c. 2–3.5 mm	c. 3.0 mm
Staminal corona of small protuberances	absent	present	absent
Corolline corona in small lobes extending beyond corolla tube	present	absent	present
Corpusculum length	c. 0.12 mm	0.10–0.12 mm	0.14–0.15 mm
Pollinia length	c. 0.26 mm	0.14–0.20 mm	c. 0.12 mm
Follicles	fusiform	fusiform	fusiform-ovoid

Gymnema sylvestre (Retz.) R. Br. ex Schultes, Syst. Veg. 6: 57 (1820); *Periploca sylvestris* Retz., Observ. bot. 2: 15 (1791). **Type**: *Koenig* 6733 (lecto (here designated): LD). Sprengel, Syst. Veg. 1: 844 (1825); Wight, Contr. bot. India 44 (1834); Wight, Icon. pl. Ind. orient. 2: t. 349 (1840); Decne in DC., Prod. 8: 621 (1844); Thwaites, Enum. pl. zeyl. 197 (1860); J.D. Hook., Fl. Brit. India. 4: 29 (1883); Trimen, Handb. fl. Ceylon 3: 153 (1895); Tsiang & Li, Acta Phytotax. Sin. 12: 12–13 (1976); H. Huber, Rev. Handb. fl. Ceylon 4: 100–102 (1983).

Asclepias geminata Roxb., Fl. ind. ed. 1832 2: 45 (1832). **Type**: not designated.

Woody vine, perennial; with white latex. Stems twining; internode length variable to 7 cm. Leaves petiolate; lamina ovate, oblong-ovate to oblong-elliptic, up to 9 cm long and 5.5 cm wide, base rounded, truncate or shallowly cordate, apex acuminate or shortly acuminate, pinnately veined, secondary venation not prominent, upper surface green to grey-green, paler beneath, densely pubescent with uniseriate hairs; petiole 0.4–1.2 cm long, c. 1 mm diameter; extrafloral nectaries 2–4 at lamina base. Flowers borne on upper 2–10 nodes. Cymes umbelliform, appearing at the nodes between the pair of leaves, usually paired, 1-many-flowered; peduncle 2–4 mm long, c. 1 mm diameter, finely pubescent, pale green. Pedicels 2–4 mm long, c. 0.25 mm diameter, finely pubescent. Flowers cream, campanulate, c. 3 mm long, 3 mm diameter; tube up to 1.5 mm long. Sepals 5, distinct, elliptic to oblong, externally finely pubescent, c. 1 mm long, 1 mm wide, generally with 1–2 small glands at base on the adaxial side. Petals 5, distinct, acute to oblong, externally glabrous, internally with few sparse hairs, semi-reflexed at anthesis, 1.5–2 mm long, c. 1 mm wide. Corolline corona of 5 thickened lobes c. 1 mm long, running longitudinally down corolla tube and alternating with corolla lobes, densely pubescent on edges; free ends of lobes erect, subulate, just exceeding corolla throat, 0.25–0.5 mm long. Staminal column 1–1.5 mm long, 0.75–1 mm diameter. Anther appendages acute, 0.25–0.5 mm long, 0.25–0.5 mm wide. Slit between anther wings c. 0.75 mm long. Style-head conical, c. 0.75 mm longer than staminal column, c. 0.75 mm diameter. Pollinarium 0.15 mm long, 0.26 mm wide; pollinia oblong, held erect, 0.15 mm long, 0.07 mm wide, golden; corpusculum oblong, 0.12 mm long, 0.06 mm wide, tan; caudicles attached to base of corpusculum, 0.06 mm long, 0.02 mm wide. Ovaries free, glabrous, c. 0.75 mm long, 0.75 mm wide. Follicles fusiform, glabrous, 4.5 cm long, 4 mm diameter. Seed not seen. **Fig. 8**.

Specimens examined: **India**. Hill beyond Bageshpur, Hassan District, Aug 1969, *Saldanha* 14378 (BRI; US *n.v.*); Shivadi Ghort, May 1969, *Saldanha* 13395 (BRI; US *n.v.*); Kadamane road, *Ramamoorthy* HFP1892 (BRI; US *n.v.*); Maisor & Carnatic, *Thomson* [AQ217135] (BRI; K *n.v.*).

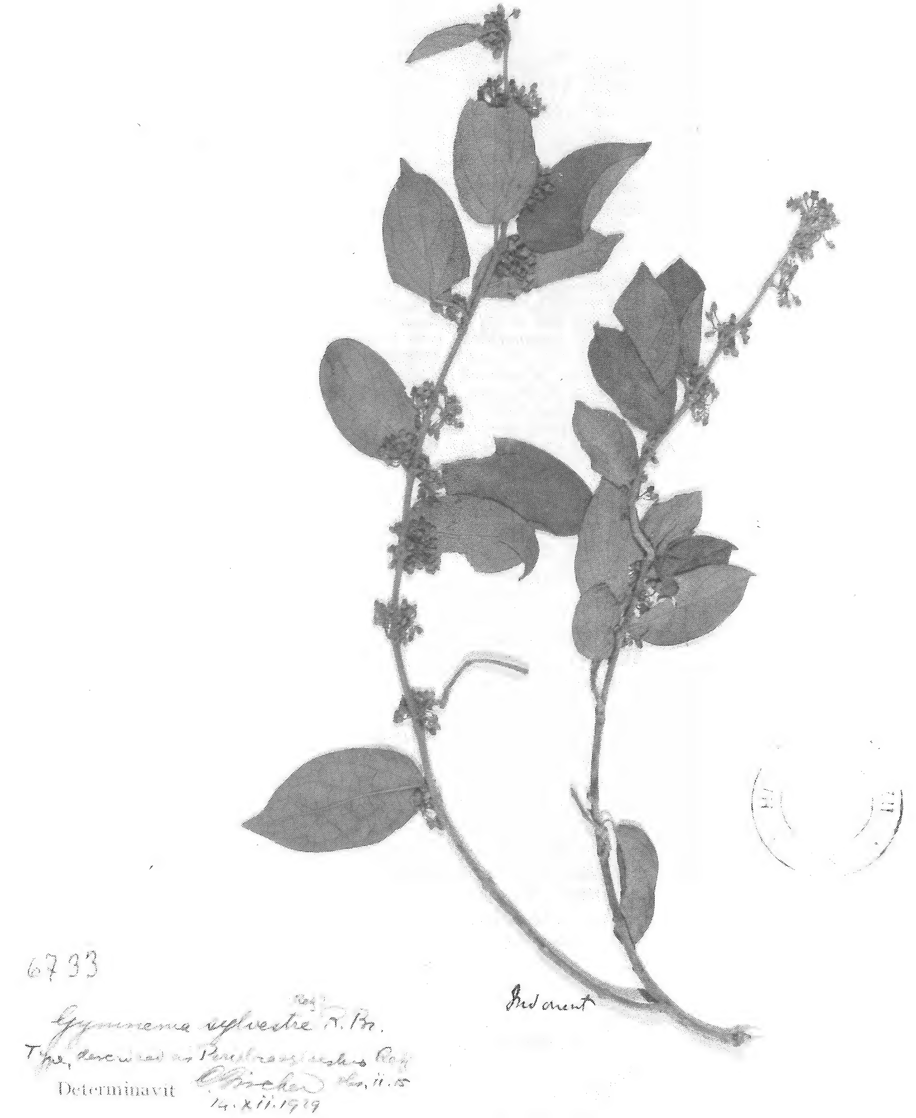

Fig. 8. *Periploca sylvestris* Retz. Lectotype: Koenig 6733 (LD). Lund herbarium stamp is 31 mm diameter.

Distribution: *G. sylvestre* occurs in the Indian subcontinent, parts of China and southeast Asia.

Notes: Tsiang & Li (1976) list a long series of synonyms for *G. sylvestre*, however it has not been possible to see the types of all of these and hence they are not given above.

Huber (1983) gave the type of *G. sylvestre* as being "Koenig s.n. (LD not seen)". The Koenig herbarium consists of numbered specimens. There are two sheets numbered 6733, one of which is referable to the original (albeit brief) description of *G. sylvestre* as *Periploca sylvestris* (Retzius 1781) (**Fig. 8**) and hence is chosen lectotype of that name. The other sheet is from a species of *Cynanchum* and may represent the type material of *Periploca tunicata* Retz.

Gymnema pleiadenium F. Muell., Fragm. 11: 77–78 (1878). **Type**: East Australia, 1848, *W. Hill* (holo: MEL(MEL 1515481)).
Bailey, Queensl. fl. 3: 104 (1900).

Gymnema dunnii (Maiden & Betche) P. Forster, Austrobaileya 2: 401 (1987), *Marsdenia rostrata* var. *dunnii* Maiden & Betche, Proc. Linn. Soc. New South Wales 31: 736 (1906), **synon. nov. Type**: New South Wales, Acacia Creek, McPherson Range, December 1905, *J.L. Dunn* (holo: NSW; iso: BRI(AQ333081)).

The species is described in detail in Forster (1987).

Additional specimens examined: **Western Australia**. Devil's Pass, Napier Range, May 1905, *Fitzgerald* 595 (BRI,PERTH); Hann & Barnett Rivers, Jun 1905, *Fitzgerald* 1122 (PERTH); Champagny Is, Bonaparte Archipelago, May 1972, *Wilson* 10946 (PERTH); Under cliff of Mt Trafalgar, St George Basin, 15°17′S, 125°04′E, Jan 1989, *Kenneally* 10918 & *Hyland* (BRI,PERTH). **Queensland**. COOK DISTRICT: Forty Mile Scrub, 18°07′S, 144°49′E, Feb 1972, *Hyland* 5870 (QRS); ditto, Apr 1977, *Gray* 450 (QRS); ditto, (cult. Atherton) Nov 1981, *Barbagallo* 14 (QRS), (cult. Tolga) Apr 1988, *Sankowsky* [AQ408489] (BRI*); Jervoise Holding, 18°54′S, 144°43′E, May 1979, *Hyland* 9921 (QRS). LEICHHARDT DISTRICT: Gracemere, Dec 1869, *O'Shanesy* 1204 (MEL); Glenmoral Gap, 13 km WSW of Theodore, 24°58′S, 149°57′E, Jan 1987, *Forster* 2858 (BRI); Expedition Range, Rolleston Road, 24°37′S, 149°02′E, Mar 1988, *Forster* 3606 (BRI). WIDE BAY DISTRICT: Mt Glastonbury, 26°14′S, 152°29′E, Jan 1987, *Forster* 2873 & *Sharpe* (BRI); St Agnes Ck, Walla Stn, 25°09′S, 151°56′S, Nov 1987, *Forster* 3267 & *Zillman* (BRI).

Distribution: In addition to that cited in Forster (1987), material has been collected or noted for three further pastoral districts in Queensland and the Kimberley region in Western Australia. *G. pleiadenium* occurs in the MCPH, CYRK, BURD, DWSN and KIMB regions of Barlow (1985) **(Map 3)**.

Notes: F.M. Bailey in a letter to von Mueller attached to the type of *G. pleiadenium* mentions that Hill "thought he got it from the Pine River". This would be the Pine River east of Brisbane, as Hill's collecting activities during this period were apparently restricted to south-east Queensland.

The populations from northern Australia (illustrated by Williams (1988: 198)) and Western Australia show some slight differences to those from southern Queensland and northern New South Wales described by Forster (1987). These are the somewhat larger leaves, leaf base nearly always cordate, seed pods 6–7 cm long, pedicels up to 7 mm long, slit between anther wings *ca* 0.75 mm long and pollinia 0.17–0.2 mm long (**Fig. 9**). The generally larger leaves of the northern populations are to some extent a result of phenotypic expresssion, as material from the Forty Mile Scrub (*Gray* 450) which was subsequently cultivated at Atherton (*Barbagallo* 14) produced smaller leaves similar to material from the southern part of the range in Australia. By comparison material from the same locality cultivated at Tolga (*Sankowsky* AQ408489) did not differ from the field collected material.

Gymnema geminatum R. Br., Prod. 462 (1810). **Type**: Islands of the Gulf of Carpentaria, December 1802, *R. Brown* (lecto (here designated): BM; isolecto: MEL(MEL 113347),BRI(AQ333083)).
Sprengel, Syst. Veg. 1: 844 (1825); Decne in DC., Prod. 8: 623 (1844).

[*Gymnema sylvestre* auct. non (Retz.) R. Br. ex Schultes: Benth., Fl. austral. 4: 342 (1869); Bailey, Queensl. fl. 3: 103–104 (1900).]

Woody vine, perennial, with white latex. Stems twining, to 2 cm thick, with corky grey-brown bark; internode length variable to 6 cm. Leaves petiolate; lamina ovate to ovate-

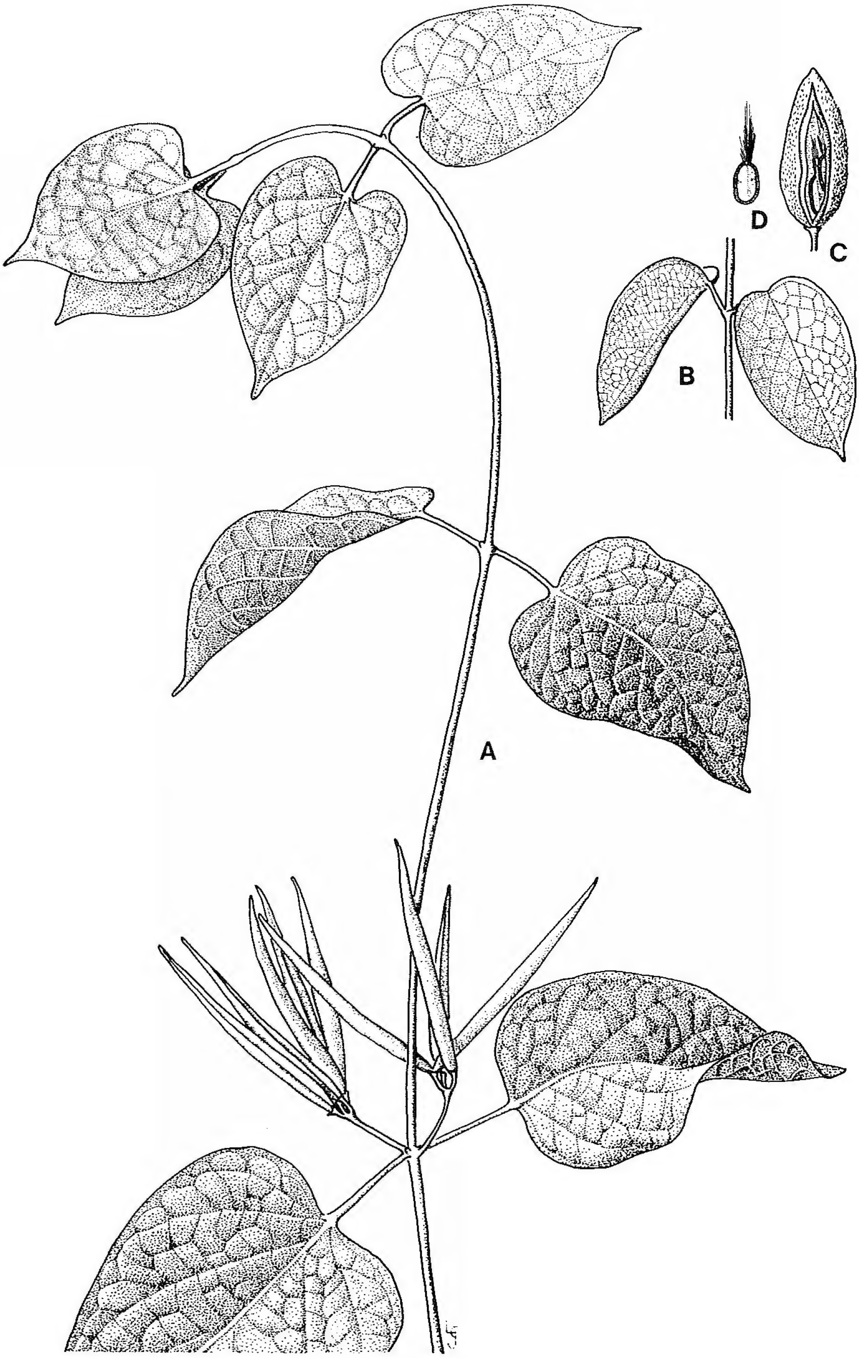

Fig. 9. A. *Gymnema pleiadenium*: habit showing larger more cordate leaves of northern populations, and longer fruits. × 0.5. B–D. *Gymnema geminatum*: B. leaf pair showing prominent secondary venation × 0.5. C. fruit × 0.5. D. seed × 0.5. A, Sankowsky AQ408489. B, Forster 3955; C–D, Forster 3958. Del. L. Jessup.

elliptic, up to 90 mm long and 50 mm wide, base rounded, apex acuminate, pinnately veined, secondary venation prominent, upper surface green to grey-green, paler to yellow-green beneath, finely pubescent with uniseriate hairs; petiole 7–26 mm long, 1 mm wide; extrafloral nectaries 3 or 4 at lamina base. Flowers borne at upper 2–10 nodes. Cymes umbelliform, appearing at the nodes between the pair of leaves, 1-many-flowered, often 2 per node; peduncle 3–8 mm long, c. 1 mm wide, finely pubescent, pale green. Pedicels 2–5 mm long, c. 0.5 mm diameter, finely pubescent. Flowers cream, campanulate, c. 4–5 mm long, 2.5 mm diameter, tube up to 2 mm long. Sepals 5, distinct, ovate to elliptic, lobed from 1/2 to 3/4 length, externally finely pubescent, generally with 2–4 small glands at base on the adaxial side. Petals elliptic to oblong, externally glabrous, internally shortly pubescent, semi-reflexed at anthesis, c. 1.5 mm long, 1 mm wide. Corolline corona of 5 thickened ridges running down corolla tube and alternating with corolla lobes, densely pubescent on edges; free ends of lobes erect, linear-subulate, arching over staminal column, 0.4–0.75 mm long. Staminal column c. 2 mm long, 1 mm diameter. Anther appendages acute, c. 0.55 mm long, 0.5 mm wide. Slit between anther wings c. 0.75 mm long. Style-head conical, c. 1 mm longer than staminal column, c. 1 mm diameter, cream. Pollinarium 0.2 mm long, 0.4 mm wide; pollinia oblong, held erect, 0.12 mm long, 0.07 mm wide, golden; corpusculum oblong, 0.14–0.15 mm long, 0.05–0.06 mm wide, dark brown; caudicles attached to base of corpusculum, 0.15–0.16 mm long, 0.07 mm wide at point of attachment to pollinium, 0.02 mm wide at point of attachment to corpusculum. Ovaries free, glabrous, c. 0.75 mm long, 0.75 mm wide. Follicles fusiform to narrowly ovoid, shortly pubescent, 2.5–5 cm long, 4–13 mm wide. Seed oblong, tan, 5–7 mm long, 2–3 mm wide; coma white, attached to micropylar end of seed, 10–20 mm long. **Fig. 9**.

Selected specimens. **Western Australia**. Kununurra District, 15°18′S, 128°45′E, 1978, *Gowland* 613 (DNA); Goose Hill, E. Kimberley, Sep 1906, *Fitzgerald* 1602 (BRI,NSW,PERTH); Boongaree Is, Prince Frederick Harbour, 15°55′S, 125°10′E, Jul 1973, *Wilson* 11373 (PERTH); Cape Leveque, 16°25′S, 122°57′E, Apr 1988, *Dunlop* 7828 (BRI,DNA,NSW,PERTH). **Northern Territory**. near Prawn farm, off Channel Is Road, 12°29′S, 130°58′E, Dec 1987, *Cox* [AQ408477] (BRI*); East Point, Darwin, Jan 1988, *Stobo* [AQ408490] (BRI*); Port Darwin, 1883, *Holtze* 300 (MEL); Humpty Doo, Dec 1961, *McKee* 8322 (BRI); Liverpool River Mouth, Tudor Pt, 11°59′S, 134°15′E, Jun 1987, *Russell-Smith* 2558 (DNA); Groote Eylandt, Umbakumba, 4 mile Jungle, 13°52′S, 136°47′E, Jul 1987, *Russell-Smith* 2868 & *Lucas* (DNA); Murganella area, 11°26′S, 132°58′E, Feb 1984, *Jones* 1389 (DNA); Brogden Pt, Murganella area, 11°31′S, 133°04′E, Feb 1984, *Jones* 1371 (DNA*). **Queensland**. COOK DISTRICT: Mapoon, May 1901, *Bailey* [AQ216534] (BRI); Z North Fauna Survey Site 17, Weipa, 12°39′S, 141°54′E, 1982, *Morton* [AQ378134] (BRI); Few miles SE of Chillagoe, 17°10′S, 144°35′E, Jan 1972, *Hyland* 5828 (QRS); 17.5 km from Almaden on Chillagoe Rd, 17°16′S, 144°34′E, Mar 1988, *Forster* 3955 (BRI,CANB); 1.5 km past Mungana trucking yards, 17°06′S, 144°23′E, Mar 1988, *Forster* 3958 (BRI,CANB). BURKE DISTRICT: Karumba, Aug 1943, *Blake* 15135 (BRI).

Distribution and habitat: Apparently restricted to Australia in the KIMB, ARNM, CARP and CYRK regions of Barlow (1985) **(Map 4)**. *G. geminatum* occurs in deciduous microphyll vine thickets on a variety of substrate types.

Phenology: Flowering throughout the year with fruiting occurring two to three months after flowering.

Conservation status: The species is widespread and not vulnerable, endangered or rare at present.

BRACHYSTELMA Sims

An account of *Brachystelma* Sims in Australia and New Guinea has been given by Forster (1988). As noted by P.G. Wilson (in litt.), the prior name to be used for the single species recognised, is *B. glabriflorum* (F. Muell.) Schltr. and not *B. microstemma* Schltr. which is a *nom. nov.* based on *Microstemma tuberosum* R. Br.

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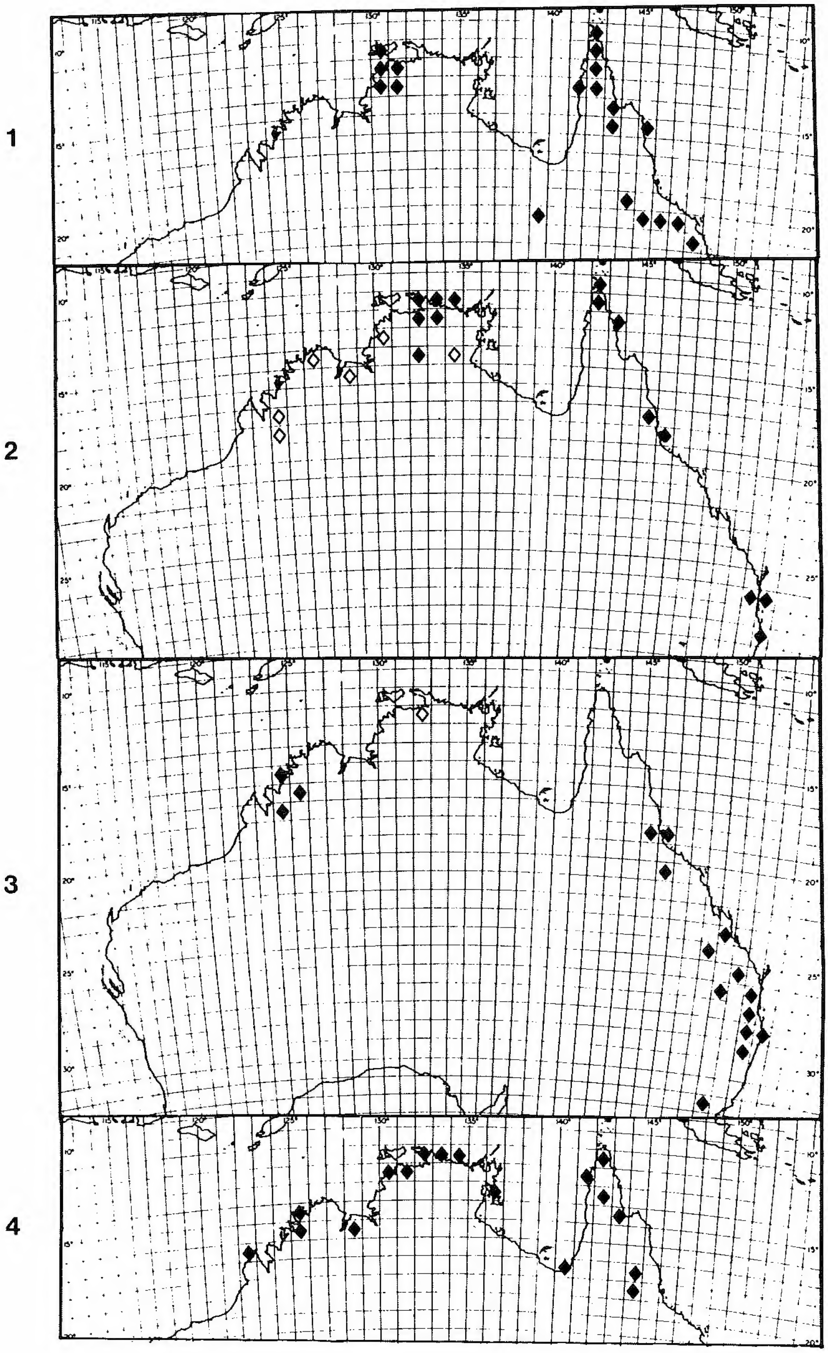

Maps 1-4. Distribution in Australia mapped at 1:250 000 grid scale: 1. ◆ *Tylophora erecta*. 2. ◇ *Sarcostemma esculentum*; ◆ *Tylophora benthamii*. 3. ◇ *Finlaysonia obovata*; ◆ *Gymnema pleiadenium*. 4. ◆ *Gymnema geminatum*.

type material of several species and arranged for photographs to be taken. The latter provided detailed notes on the type sheets of *Finlaysonia obovata.* P.G. Wilson (PERTH) brought to my attention the priority problem in *Brachystelma.* The Queensland Herbarium provided working space and processed loan material. The Directors of BRI, CANB, CBG, DNA, JCT, LD, MEL, PERTH and QRS provided access to material either at their institutions or on loan. The Australian Biological Resources Study provided partial financial support in 1988. E.M. Ross (BRI) provided constructive comments on the manuscript. All are gratefully acknowledged.

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